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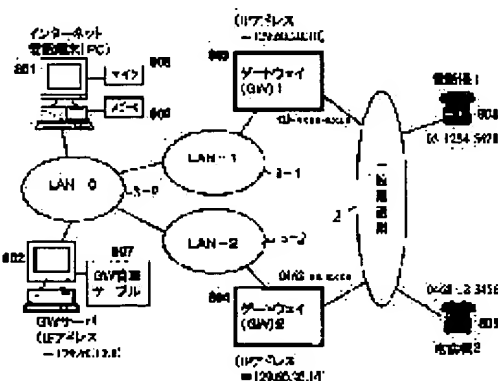
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(54) GATEWAY SELECTION METHOD AND DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To improve the operability of the gateway selection method/device for users by making a gateway server store the correspondence between the IP address of a gateway in a network and a toll number and then select and reply a proper gateway against the inquiry given from an internet telephone terminal.

SOLUTION: An internet telephone terminal 801 transmits the telephone number (03-1234-5678) of a telephone set 808 of the opposite party of calling to a gateway server 802 and inquires about the IP address of the gateway to be connected. The server 802 retrieves a gateway management table 807 and returns the IP address (129.60.20.10) of a gateway 803 corresponding to the toll number (03) to the terminal 801. The terminal 801 transmits a calling packet including the number of the set 803 added to the IP address of the gateway 803. The gateway 803 establishes its channel via a general telephone network 2.



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CLAIMS

[Claim(s)]

[Claim 1]Two or more client terminals have an IP address, respectively, and are accommodated in LAN, and. In a network accommodated in a common telephone network, a general telephone set connects a gateway server with an IP address to LAN, and. It is provided between LAN concerned and said general telephone network, and mediate information transmission and reception between the both concerned, and connect, and a gateway with an IP address said gateway server, Call origination is carried out from a client terminal which provides a gateway management table which matched a suburban number and said IP address of a telephone number which said each gateway has, and is accommodated in said LAN. If a telephone number of telephone accommodated in a common telephone network is transmitted to said gateway server, The gateway server concerned searches said gateway management table, one IP address of said gateway is extracted, and said client terminal which carried out call origination communicates with said telephone via the gateway concerned from which an IP address was extracted. A gateway selection method characterized by things.

[Claim 2]Two or more client terminals have an IP address, respectively, and are accommodated in LAN, and. In a network accommodated in a common telephone network, a general telephone set connects a gateway server with an IP address to LAN, and. It is provided between LAN concerned and said general telephone network, and mediate information transmission and reception between the both concerned, and connect, and a gateway with an IP address said gateway server, Call origination is carried out from telephone which provides a gateway management table which matched a suburban number and said IP address of a telephone number which said each gateway has, and is accommodated in said general telephone network. In communicating with the other party's telephone accommodated in a common telephone network, the telephone concerned which carries out call origination via a nearby gateway. Transmit and a telephone number of said other party's telephone the nearby gateway concerned, Via said gateway information table of said gateway server, A gateway selection method, wherein it notifies to telephone which extracted and carried out call origination of the IP address of a gateway for connecting said other party's telephone and the telephone concerned which carried out call origination communicates with the other party's telephone via the gateway concerned from which an IP address was extracted.

[Claim 3]A claim (1), wherein one of said the gateways has said gateway management table and it operates as said gateway server, or a claim (2) is a gateway selection method of a statement either.

[Claim 4]Two or more client terminals have an IP address, respectively, and are accommodated in LAN, and. A gateway server which a general telephone set is given an IP address in a network accommodated in a common telephone network, and is connected to LAN, An IP address is given, and it is connected to LAN and and between LAN concerned and said general telephone network. Have one or more gateways which are provided and mediate information transmission and reception between the both concerned, and said gateway server, Provide gateway management Dibble who matched a suburban number and said IP address of a telephone number which said each gateway

has, and. And a gateway selecting arrangement with a notice function which notifies one IP address of a gateway corresponding to the telephone number concerned corresponding to an inquiry about a telephone number of telephone accommodated in said general telephone network from said client terminal.

[Claim 5] Two or more client terminals have an IP address, respectively, and are accommodated in LAN, and. A gateway server which a general telephone set is given an IP address in a network accommodated in a common telephone network, and is connected to LAN, An IP address is given, and it is connected to LAN and and between LAN concerned and said general telephone network. Have one or more gateways which are provided and mediate information transmission and reception between the both concerned, and said gateway server, Provide gateway management Dibble who matched a suburban number and said IP address of a telephone number which said each gateway has, and. And a gateway selecting arrangement with a notice function which notifies one IP address of a gateway corresponding to the telephone number concerned corresponding to an inquiry about a telephone number of telephone accommodated in said general telephone network from one of said gateway.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]In the gateway (gateway) which this invention connects LAN (Local Area Network) by Ethernet etc., and the existing common telephone network, and performs real time audio data communications between LAN and a common telephone network, a connection destination gateway. It is related with the gateway selection method and device to choose.

[0002]

[Description of the Prior Art]Since LAN by Ethernet etc. was a network which performs communication by a packet, originally it was a network unsuitable for real time data communications, such as a sound. However, the application of the kind of the Internet telephone which exchanges a voice data packet in real time within LAN has begun to appear in recent years.

[0003]Drawing 11 shows the example of the gateway. In the numerals 1 in a figure, as for a gateway and 2, a common telephone network and 3 express LAN/Internet, 4 expresses a personal computer, and 5 expresses the telephone.

[0004]Although this kind of Internet telephone can usually communicate only within LAN, LAN and a common telephone network are connected, it is performing the protocol conversion of data and the gateway (GW) which enables communication between an Internet telephone and a general telephone is beginning to be made.

[0005]As composition of a gateway, there are some etc. which combined the exclusive IF board or the personal computer, and the general analog modem besides a dedicated device of the simple substance. Drawing 12 shows the situation of the connecting operation from an Internet telephone (personal computer) to the common telephone network using a gateway.

[0006]If the Internet telephone terminal (personal computer) 4 emits a communication start request packet via LAN3 and the gateway 1 receives the packet concerned, the gateway 1 will perform call origination to the common telephone network 2. As a result, the gateway 1 which carries out singing of the telephone 5, checks mail arrival, and performs communication establishment between the gateways 1 sends out telephone call establishment notice packets to the personal computer 4. By this result, communication is performed between the personal computer 4 and the telephone 5. Of course, data conversion between a voice data packet and an analog voice signal is performed in the place of the gateway 1 in this case.

[0007]Usually, when it sees from LAN, terminal identification of the gateway is carried out by identifier called an IP address. An IP address is expressed with four triple digits (xxx(es) are 0-255) divided by "." called xxx.xxx.xxx.xxx when expressed with a decimal number. When the numerical value of the head of triple figures is "0", the "0" concerned may be omitted and double figures may show. Drawing 13 shows the example of an IP address.

[0008]Generally, although the telex rate in LAN is a fixed amount, the telex rate per fixed time is so high that fee collection is performed by hour corresponding in a common telephone network and

there is distance. Therefore, when there are two or more sets of gateways in a network, and carrying out call origination from LAN to a common telephone network, the gateway of which telephone call area is chosen, or , becomes important from a viewpoint of a telex rate.

[0009]Drawing 14 shows the example of a network in case two or more gateways exist. A gateway is connected to two or more each LAN, and the IP address is given to each gateway.

[0010]The method of considering the target gateway as immobilization or usually specifying as a method of specifying the gateway of a connection destination, at the time of call origination is taken.

[0011]

[Problem(s) to be Solved by the Invention]. However, selection becomes difficult and actually efficient selection becomes difficult, so that a user has to find out the IP address of the target gateway by himself, and has to input it from the IP address of all the gateways in a network in this method and the number of gateways increases. There was a problem to say.

[0012]To the common user, using an IP address for connection partner point specification needed to memorize a maximum of 12 digits of an unfamiliar IP address, it needed to input this, and had the problem of being hard to use in man machine interface.

[0013]Although the IP address was a systematically important number and it was a number not to release to the exterior where networks differ, there was a problem that there was the necessity of releasing this outside.

[0014]It is that a telex rate chooses most the gateway which becomes cheap from the inputted telephone number of a connection destination automatically to this telephone number when carrying out call origination to a common telephone network via a gateway, in order that this invention may solve the above-mentioned problem, It aims at lessening the telex rate which a user pays and raising a user's user-friendliness, and concealing the IP address of a gateway and raising the security on a system from a user, by that cause.

[0015]

[Means for Solving the Problem]Drawing 1 shows an example lineblock diagram of this invention with a gateway server. A gateway server in which provide a gateway and 3-i by LAN, four are provided with a personal computer (an Internet telephone terminal, a client terminal), and 6 is provided for numerals 1-i in a figure by this invention, and 7 express management information.

[0016]In this invention, a case where two or more above-mentioned gateways are arranged at a certain amount of range in networks, such as the Internet, is assumed. In a network, the gateway server 6 for managing an address of a gateway besides a gateway is arranged.

[0017]A means by which this gateway server 6 records correspondence with an IP address of a gateway in a network, and a long-distance number of a telephone number which this gateway has, A means to receive an inquiry by a telephone number from an Internet telephone terminal in a network, It searches within a self-device based on this telephone number that received, and has a means to choose a suitable gateway, and a means to reply an IP address of a selected gateway to this Internet telephone terminal of inquiry origin.

[0018]The Internet telephone terminal (client terminal) 4 of a side which asks, A means to memorize an IP address of the gateway server 6 of a reference when carrying out call origination to a common telephone network via a gateway, It has a means to input a telephone number of a common telephone network of a connection destination, a means to ask an IP address of a gateway to a gateway server by this telephone number, and a means to receive a return value from a gateway server.

[0019]In this invention, a telephone number of a common telephone network of a connection destination is inputted at the Internet telephone terminal 4 by the side of call origination in LAN at the time of call origination. The Internet telephone terminal 4 asks an IP address of a gateway which should be connected to the gateway server 6 set up beforehand using an inputted telephone number.

[0020]The gateway server 6 searches the management information 7 with correspondence with an IP address of a gateway within a self-terminal, and a telephone number, and chooses the most suitable gateway. Drawing 2 shows a table (gateway management information) with correspondence with an IP address of a gateway, and telephone numbers (long-distance number etc.). When a long-distance number applicable in this gateway management information is not described, a case where it processes as an error, and a case where an IP address of a gateway of a as near long-distance number as possible is returned can be considered. Here, although it was considered as a long-distance number in Japan, and combination of an IP address, it is also possible to consider it as the country code and combination of an IP address for international telecommunications.

[0021]Then, the gateway server 6 replies an IP address of this selected gateway to the Internet telephone terminal 4 of inquiry origin. Call origination of the Internet telephone terminal which received an IP address of a gateway which should be connected from a gateway server is anew carried out to a gateway of this IP address, and it performs voice communication with a connection partner via a common telephone network after connection.

[0022]

[Embodiment of the Invention]Since the telephone number matches of a connection destination are only inputted and it is connected to a suitable gateway, the user of a gateway saves the time and effort which chooses the gateway of a connection destination by itself one by one each time, and the above-mentioned composition enables it to raise operativity of him.

[0023]The long-distance number of the telephone number to which the gateway was connected enables it to choose the gateway of a communication destination in the cheapest course by choosing the gateway of a connection destination.

[0024]It becomes possible for it to become unnecessary to open the IP address of a gateway to a user, and to conceal an important IP address from a user on a system by this.

[0025]It can also have a function as a gateway server locally in a gateway. In this case, the inquiry to a gateway server is omitted, it searches within a self-device, and it becomes possible to carry out call origination to a partner gateway promptly. As a result, it becomes possible to shorten the time to connection.

[0026]A gateway server can also be existed by two or more sets in a network. In this case, an Internet telephone terminal shall ask to the gateway server (default gateway server) usually set up beforehand. When the default gateway server is downed, it shall go to the secondary gateway server set up too to ask. It becomes possible to reduce the percentage of risk where communication becomes impossible by failure of a gateway server by carrying out like this.

[0027]A gateway goes the long-distance number and IP address of a self-gateway to the nearby gateway server beforehand set as the gateway after powering on to register. At the time of a device stop, the cancellation demand of registration is advanced to a gateway server.

[0028]Drawing 3 is a figure explaining the situation of the registration processing to a gateway server. The numerals in a figure support drawing 1. Supposing it becomes a power turn in the gateway 1-1 now, the gateway 1-1 will register the long-distance number and IP address of a self-gateway to the gateway server 6 by a registration packet. By this, the gateway server 6 updates the contents of the management information (table) 7.

[0029]Each gateway server exchanges gateway information periodically. Even when a new gateway is registered / erased by carrying out like this, it becomes possible to always use the information on the newest gateway with all the gateway servers.

[0030]It is also possible to take the method of placing a master gateway server and carrying out simultaneous information from this master gateway server in the exchange of gateway information.

[0031]When two or more gateways of the same long-distance number are registered into the gateway management table 7, the 1st gateway investigates in under a telephone call, and when the 1st gateway is talking over the telephone, the IP address of the 2nd gateway shall be notified. Thereby, since a gateway is talking over the telephone, it becomes possible to reduce the probability

that communication will be unestablishable.

[0032]Drawing 4 is a figure explaining the mode of the 1st example of this invention. the numerals 2 in a figure -- common telephone network and 3-i -- LAN and 801 -- an Internet telephone terminal and 802 -- a gateway server and 803 -- a gateway and 804 -- a gateway and 805 -- a microphone and 806 -- a loudspeaker and 807 -- a gateway management table and 808 -- telephone. 809 expresses telephone.

[0033]This example is a gateway course from the terminal (personal computer) in the Internet, and is an example in the case of telephoning to the telephone of a common telephone network. The Internet telephone terminal (801), the gateway server (802), the gateway 1 (803), and the gateway 2 (804) are connected to the network to which two or more LAN was connected. The Internet telephone terminal (801) comprises a personal computer, a microphone (805) and a loudspeaker (806) are connected to a main part, and the software (it is hereafter called Internet telephone software) which makes voice communication possible via the Internet is installed. The IP address of the gateway 1 is "129.60.20.10" and the connected telephone number is taken as "03-xxxx-xxxx." The IP address of the gateway 2 is "129.60.30.10" and the connected telephone number is taken as "0468-xx-xxxx."

[0034]A gateway server (802) comprises a personal computer and has a gateway management table (807) in an inside. The example of a gateway management table (807) is shown in drawing 5. Each long-distance number and each IP address of the gateway 1 and the gateway 2 in a network are recorded on this gateway management table (807). A gateway server's (802) own IP address is set to "129.60.10.1."

[0035]From an Internet telephone terminal (801), when a telephone number connects with the telephone (808) of the common telephone network of "03-1234-5678", the telephone number "03-1234-5678" of the partner point is inputted at this Internet telephone terminal (801). This Internet telephone terminal (801) asks the IP address of the gateway which should be connected by the inputted telephone number "03-1234-5678" to the gateway server (802) of the IP address "129.60.10.1" beforehand registered into the self-device. Recognize the long-distance number "03" from the telephone number "03-1234-5678" which received, and the gateway management table (807) in a self-device is searched with this gateway server (802). The IP address "129.60.20.10" of the gateway 1 (803) corresponding to a long-distance number "03" is obtained, and this IP address "129.60.20.10" is returned to the Internet telephone terminal (801) of inquiry origin.

[0036]An Internet telephone terminal (801) will transmit a call origination packet to the gateway 1 (803) of this IP address "129.60.20.10", if the return value from a gateway server (802) is received. At this time, the telephone number "03-1234-5678" of the partner point is simultaneously told to this gateway 1 (803).

[0037]Call origination of this gateway 1 (803) is carried out to the common telephone network 2 by this telephone number "03-1234-5678" that received. The telephone call between the gateway 1 (803)-telephones 1 (808) is established because the telephone 1 (808) of this telephone number "03-1234-5678" carries out singing and carries out on hook [of this]. After telephone call establishment, this gateway 1 (803) transmits the packet which notifies telephone call establishment to an Internet telephone terminal (801), the telephone call between Internet telephone terminal (801)-telephones (808) establishes it, and transmission and reception of voice data are performed.

[0038]From an Internet telephone terminal (801), when "0468-12-3456" is applied as a telephone number of the partner point, Through the same procedure, with the gateway management table (807) of a gateway server (802), the IP address "129.60.30.10" of the gateway 2 (804) is chosen, and the telephone 2 (809) of a telephone number "0468-12-3456" is called, and carries out singing. When on hook [of the telephone 2 (809)] is carried out, the telephone call between the telephone 2(809)-gateways 2 (804) is established, and the gateway 2 (804) after that, The packet which notifies telephone call establishment is transmitted to an Internet telephone terminal (801), the telephone call between the Internet telephone terminal (801)-telephones 2 (809) is established, and

transmission and reception of voice data are performed.

[0039]Drawing 6 is a figure explaining the 2nd example mode of this invention. the numerals 2 in a figure -- common telephone network and 3-i, ** LAN, and 1001 -- a gateway and 1002, as for a gateway and 1003, a gateway server and 1004 express a gateway management table, 1005 expresses telephone, and 1006 expresses telephone.

[0040]This example is an example in the case of talking over the telephone by the telephone of a common telephone network via gateways. The gateway 1 (1001) and the gateway 2 (1002) are connected to the network to which two or more LAN was connected. The IP address of the gateway 1 is "129.60.20.10" and the connected telephone number is taken as "03-xxxx-xxxx." The IP address of the gateway 2 is "129.60.30.10" and the connected telephone number is taken as "0468-xx-xxxx."

[0041]A gateway server (1003) comprises a personal computer and has a gateway management table (1004) in an inside. The example of a gateway management table (1004) is shown in drawing 7. Each long-distance number and each IP address of the gateway 1 and the gateway 2 in a network are recorded on this gateway management table (1004). A gateway server's (1003) own IP address is set to "129.60.10.1."

[0042]From the telephone 1 (1005) connected to the common telephone network, the telephone number "xxxx-xxxx" of the nearby gateway 1 (1001) is dialed. The gateway 1 (1001) sends out the guidance which stimulates the input of the telephone number of a connection destination to the telephone 1 (1005), after auto-answering. The telephone number "0468-12-3456" of the telephone 2 (1006) of the connection partner point is inputted by the telephone 1 (1005). The gateway 1 (1001) which this telephone number "0468-12-3456" inputted by the telephone 1 (1005) was told to the gateway 1 (1001), and received this, It asks by this telephone number "0468-12-3456" that received to the gateway server (1003). From this telephone number "0468-12-3456" that received, a gateway server (1003) extracts the long-distance number "0468", and by this. The gateway management table (1004) in a self-device is searched, the IP address "129.60.30.10" of the gateway 2 corresponding to a long-distance number "0468" is obtained, and this IP address "129.60.30.10" is returned to the gateway 1 (1001) of inquiry origin. The gateway 1 (1001) transmits a call origination packet for this IP address "129.60.30.10" to the terminal of this IP address "129.60.30.10" after reception. At this time, the telephone number "0468-12-3456" of a connection destination transmits simultaneously. The gateway 2 (1002) of an IP address "129.60.30.10" is auto-send to a common telephone network by this telephone number "0468-12-3456" after receiving this, and the telephone 2 (1006) of a telephone number "0468-12-3456" carries out singing. By carrying out on hook [of this], the telephone call between the gateway 2(1002)-telephones 2 (1006) is established. After telephone call establishment, this gateway 2 (1002) transmits the packet which notifies telephone call establishment to the call origination former gateway 1 (1001), and the telephone call between the gateway 1(1001)-gateways 2 (1002) establishes it. In this stage, the gateway 1 (1001) sends the sound from the telephone 1 (1005) to the gateway 2 (1002), and, thereby, the voice communication between the telephone 1(1005)-telephones 2 (1006) establishes it.

[0043]It is a figure which explains the 3rd example mode of this invention to drawing 8. the numerals 2 in a figure -- common telephone network and 3-i -- LAN and 1201 -- an Internet telephone terminal and 1202 -- a gateway and 1203 -- a gateway and 1204 -- a microphone and 1205 -- a loudspeaker and 1206 -- the gateway management table of the gateway 1. 1207 expresses the gateway management table of the gateway 2, 1208 expresses telephone, and 1209 expresses telephone.

[0044]This example is an example in the case (when there is no gateway server) of having a gateway management table and a gateway server function in a gateway. The Internet telephone terminal (1201), the gateway (gateway) 1 (1202), and the gateway 2 (1203) are connected to the network to which two or more LAN was connected. An Internet telephone terminal (1201) shall comprise a personal computer, a microphone (1204) and a loudspeaker (1205) shall be connected to a main part,

and the software (it is hereafter called Internet telephone software) which makes voice communication possible via the Internet shall be installed. The IP address of the gateway 1 is "129.60.20.10" and the connected telephone number is taken as "03-xxxx-xxxx." The IP address of the gateway 2 is "129.60.30.10" and the connected telephone number is taken as "0468-xx-xxxx."

[0045] There is a gateway management table (1206) in the inside of the gateway 1 (1202). The example of the gateway management table (1206) of the gateway 1 is shown in drawing 9. Each long-distance number and each IP address of the gateway 1 and the gateway 2 in a network are recorded on this gateway management table (1206). The gateway 1 (1202) has the function to search the gateway management table (1206) in a self-device, and to return the IP address of an applicable gateway, to the inquiry by a telephone number.

[0046] There is a gateway management table (1207) also in the inside of the gateway 2 (1203). The example of the gateway management table (1207) of the gateway 2 is shown in drawing 10. The gateway management tables (1207) of this gateway 2 (1203) are the same contents as the gateway management table (1206) of the gateway 1 (1202). There is a function to return the IP address of the gateway which searches the gateway management table (1207) in a self-device also to the gateway 2 (1203), and corresponds to it to the inquiry by a telephone number.

[0047] From an Internet telephone terminal (1201), when a telephone number connects with the telephone 1 (1208) of the common telephone network of "03-1234-5678", the telephone number "03-1234-5678" of the partner point is inputted at this Internet telephone terminal (1201). This Internet telephone terminal (1201) is beforehand registered into a self-device. The IP address of the gateway which should be connected by the inputted telephone number "03-1234-5678" is asked to the gateway 1 (1202) of the IP address "129.60.20.10" which occurred. The long-distance number "03" is recognized from the telephone number "03-1234-5678" which received, the gateway management table (1206) in a self-device is searched with this gateway 1 (1202), and the IP address of the gateway 1 corresponding to a long-distance number "03" is looked for. As a result, it turns out that an applicable gateway is a self-device since this is the same as the IP address of a self-device (gateway 1 (803)) although the IP address "129.60.20.10" is obtained. Therefore, this gateway 1 (1202) is the partner point telephone number "03-1234-5678" which received, it is sent to a common telephone network and the telephone 1 (1208) of a telephone number "03-1234-5678" carries out singing. The telephone call between on hook, then the gateway 1 (1202)-telephone 1 (1208) establishes the telephone 1 (1208). After telephone call establishment, this gateway 1 (1202) transmits the packet which notifies telephone call establishment to an Internet telephone terminal (1201), the telephone call between the Internet telephone terminal (1201)-telephones 1 (1208) establishes it, and transmission and reception of voice data are performed.

[0048] From an Internet telephone terminal (1201), as a telephone number of the partner point, when the telephone number "0468-12-3456" of the telephone 2 (1209) is applied, This Internet telephone terminal (1201) is the telephone number "0468-12-3456" inputted to the gateway 1 (1202) of the IP address "129.60.20.10" beforehand registered into the self-device, The IP address of the gateway which should be connected is asked. Recognize the long-distance number "0468" from the telephone number "0468-12-3456" which received, and the gateway management table (1206) in a self-device is searched with this gateway 1 (1202), The IP address of the gateway corresponding to a long-distance number "0468" is looked for, the IP address "129.60.30.10" is obtained, and this is returned to the Internet telephone terminal (1201) of inquiry origin. An Internet telephone terminal (1201) transmits a call origination packet to this received IP address "129.60.30.10." This tense hand's telephone number "0468-12-3456" is simultaneously told to this gateway 2 (1203). Call origination of this gateway 2 (1203) is carried out to a common telephone network by this telephone number "0468-12-3456" that received. The telephone call between the gateway 2 (1203)-telephones 2 (1209) is established because the telephone 2 (1209) of this telephone number "0468-12-3456" carries out singing and carries out on hook [of this]. After telephone call establishment, this gateway 2 (1203) transmits the packet which notifies telephone call establishment to an Internet

telephone terminal (1201), the telephone call between the Internet telephone terminal (1201)-
telephones 2 (1209) establishes it, and transmission and reception of voice data are performed.
[0049]

[Effect of the Invention]As explained above, according to this invention, via a gateway. It becomes possible to enable a telex rate to choose most the gateway which becomes cheap from the inputted telephone number of a connection destination automatically to this telephone number, when carrying out call origination to a common telephone network, and to lessen the telex rate which a user pays, and to raise a user's user-friendliness.

[0050]The IP address of a gateway is concealed and this enables it to raise the security on a system from a user.

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TECHNICAL FIELD

[Field of the Invention]In the gateway (gateway) which this invention connects LAN (Local Area Network) by Ethernet etc., and the existing common telephone network, and performs real time audio data communications between LAN and a common telephone network, a connection destination gateway. It is related with the gateway selection method and device to choose.

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PRIOR ART

[Description of the Prior Art]Since LAN by Ethernet etc. was a network which performs communication by a packet, originally it was a network unsuitable for real time data communications, such as a sound. However, the application of the kind of the Internet telephone which exchanges a voice data packet in real time within LAN has begun to appear in recent years.

[0003]Drawing 11 shows the example of the gateway. In the numerals 1 in a figure, as for a gateway and 2, a common telephone network and 3 express LAN/Internet, 4 expresses a personal computer, and 5 expresses the telephone.

[0004]Although this kind of Internet telephone can usually communicate only within LAN, LAN and a common telephone network are connected, it is performing the protocol conversion of data and the gateway (GW) which enables communication between an Internet telephone and a general telephone is beginning to be made.

[0005]As composition of a gateway, there are some etc. which combined the exclusive IF board or the personal computer, and the general analog modem besides a dedicated device of the simple substance. Drawing 12 shows the situation of the connecting operation from an Internet telephone (personal computer) to the common telephone network using a gateway.

[0006]If the Internet telephone terminal (personal computer) 4 emits a communication start request packet via LAN3 and the gateway 1 receives the packet concerned, the gateway 1 will perform call origination to the common telephone network 2. As a result, the gateway 1 which carries out singing of the telephone 5, checks mail arrival, and performs communication establishment between the gateways 1 sends out telephone call establishment notice packets to the personal computer 4. By this result, communication is performed between the personal computer 4 and the telephone 5. Of course, data conversion between a voice data packet and an analog voice signal is performed in the place of the gateway 1 in this case.

[0007]Usually, when it sees from LAN, terminal identification of the gateway is carried out by identifier called an IP address. An IP address is expressed with four triple digits (xxx(es) are 0-255) divided by "." called xxx.xxx.xxx.xxx when expressed with a decimal number. When the numerical value of the head of triple figures is "0", the "0" concerned may be omitted and double figures may show. Drawing 13 shows the example of an IP address.

[0008]Generally, although the telex rate in LAN is a fixed amount, the telex rate per fixed time is so high that fee collection is performed by hour corresponding in a common telephone network and there is distance. Therefore, when there are two or more sets of gateways in a network, and carrying out call origination from LAN to a common telephone network, the gateway of which telephone call area is chosen, or , becomes important from a viewpoint of a telex rate.

[0009]Drawing 14 shows the example of a network in case two or more gateways exist. A gateway is connected to two or more each LAN, and the IP address is given to each gateway.

[0010]The method of considering the target gateway as immobilization or usually specifying as a method of specifying the gateway of a connection destination, at the time of call origination is taken.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, according to this invention, via a gateway. It becomes possible to enable a telex rate to choose most the gateway which becomes cheap from the inputted telephone number of a connection destination automatically to this telephone number, when carrying out call origination to a common telephone network, and to lessen the telex rate which a user pays, and to raise a user's user-friendliness.

[0050]The IP address of a gateway is concealed and this enables it to raise the security on a system from a user.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]. However, selection becomes difficult and actually efficient selection becomes difficult, so that a user has to find out the IP address of the target gateway by himself, and has to input it from the IP address of all the gateways in a network in this method and the number of gateways increases. There was a problem to say.

[0012]To the common user, using an IP address for connection partner point specification needed to memorize a maximum of 12 digits of an unfamiliar IP address, it needed to input this, and had the problem of being hard to use in man machine interface.

[0013]Although the IP address was a systematically important number and it was a number not to release to the exterior where networks differ, there was a problem that there was the necessity of releasing this outside.

[0014]It is that a telex rate chooses most the gateway which becomes cheap from the inputted telephone number of a connection destination automatically to this telephone number when carrying out call origination to a common telephone network via a gateway, in order that this invention may solve the above-mentioned problem, It aims at lessening the telex rate which a user pays and raising a user's user-friendliness, and concealing the IP address of a gateway and raising the security on a system from a user, by that cause.

[Translation done.]

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MEANS

[Means for Solving the Problem]Drawing 1 shows an example lineblock diagram of this invention with a gateway server. A gateway server in which provide a gateway and 3-i by LAN, four are provided with a personal computer (an Internet telephone terminal, a client terminal), and 6 is provided for numerals 1-i in a figure by this invention, and 7 express management information.

[0016]In this invention, a case where two or more above-mentioned gateways are arranged at a certain amount of range in networks, such as the Internet, is assumed. In a network, the gateway server 6 for managing an address of a gateway besides a gateway is arranged.

[0017]A means by which this gateway server 6 records correspondence with an IP address of a gateway in a network, and a long-distance number of a telephone number which this gateway has, A means to receive an inquiry by a telephone number from an Internet telephone terminal in a network, It searches within a self-device based on this telephone number that received, and has a means to choose a suitable gateway, and a means to reply an IP address of a selected gateway to this Internet telephone terminal of inquiry origin.

[0018]The Internet telephone terminal (client terminal) 4 of a side which asks, A means to memorize an IP address of the gateway server 6 of a reference when carrying out call origination to a common telephone network via a gateway, It has a means to input a telephone number of a common telephone network of a connection destination, a means to ask an IP address of a gateway to a gateway server by this telephone number, and a means to receive a return value from a gateway server.

[0019]In this invention, a telephone number of a common telephone network of a connection destination is inputted at the Internet telephone terminal 4 by the side of call origination in LAN at the time of call origination. The Internet telephone terminal 4 asks an IP address of a gateway which should be connected to the gateway server 6 set up beforehand using an inputted telephone number.

[0020]The gateway server 6 searches the management information 7 with correspondence with an IP address of a gateway within a self-terminal, and a telephone number, and chooses the most suitable gateway. Drawing 2 shows a table (gateway management information) with correspondence with an IP address of a gateway, and telephone numbers (long-distance number etc.). When a long-distance number applicable in this gateway management information is not described, a case where it processes as an error, and a case where an IP address of a gateway of a as near long-distance number as possible is returned can be considered. Here, although it was considered as a long-distance number in Japan, and combination of an IP address, it is also possible to consider it as the country code and combination of an IP address for international telecommunications.

[0021]Then, the gateway server 6 replies an IP address of this selected gateway to the Internet telephone terminal 4 of inquiry origin. Call origination of the Internet telephone terminal which received an IP address of a gateway which should be connected from a gateway server is anew carried out to a gateway of this IP address, and it performs voice communication with a connection

partner via a common telephone network after connection.

[0022]

[Embodiment of the Invention] Since the telephone number matches of a connection destination are only inputted and it is connected to a suitable gateway, the user of a gateway saves the time and effort which chooses the gateway of a connection destination by itself one by one each time, and the above-mentioned composition enables it to raise operativity of him.

[0023] The long-distance number of the telephone number to which the gateway was connected enables it to choose the gateway of a communication destination in the cheapest course by choosing the gateway of a connection destination.

[0024] It becomes possible for it to become unnecessary to open the IP address of a gateway to a user, and to conceal an important IP address from a user on a system by this.

[0025] It can also have a function as a gateway server locally in a gateway. In this case, the inquiry to a gateway server is omitted, it searches within a self-device, and it becomes possible to carry out call origination to a partner gateway promptly. As a result, it becomes possible to shorten the time to connection.

[0026] A gateway server can also be existed by two or more sets in a network. In this case, an Internet telephone terminal shall ask to the gateway server (default gateway server) usually set up beforehand. When the default gateway server is downed, it shall go to the secondary gateway server set up too to ask. It becomes possible to reduce the percentage of risk where communication becomes impossible by failure of a gateway server by carrying out like this.

[0027] A gateway goes the long-distance number and IP address of a self-gateway to the nearby gateway server beforehand set as the gateway after powering on to register. At the time of a device stop, the cancellation demand of registration is advanced to a gateway server.

[0028] Drawing 3 is a figure explaining the situation of the registration processing to a gateway server. The numerals in a figure support drawing 1. Supposing it becomes a power turn in the gateway 1-1 now, the gateway 1-1 will register the long-distance number and IP address of a self-gateway to the gateway server 6 by a registration packet. By this, the gateway server 6 updates the contents of the management information (table) 7.

[0029] Each gateway server exchanges gateway information periodically. Even when a new gateway is registered / erased by carrying out like this, it becomes possible to always use the information on the newest gateway with all the gateway servers.

[0030] It is also possible to take the method of placing a master gateway server and carrying out simultaneous information from this master gateway server in the exchange of gateway information.

[0031] When two or more gateways of the same long-distance number are registered into the gateway management table 7, the 1st gateway investigates in under a telephone call, and when the 1st gateway is talking over the telephone, the IP address of the 2nd gateway shall be notified. Thereby, since a gateway is talking over the telephone, it becomes possible to reduce the probability that communication will be unestablishable.

[0032] Drawing 4 is a figure explaining the mode of the 1st example of this invention. the numerals 2 in a figure -- common telephone network and 3-i -- LAN and 801 -- an Internet telephone terminal and 802 -- a gateway server and 803 -- a gateway and 804 -- a gateway and 805 -- a microphone and 806 -- a loudspeaker and 807 -- a gateway management table and 808 -- telephone. 809 expresses telephone.

[0033] This example is a gateway course from the terminal (personal computer) in the Internet, and is an example in the case of telephoning to the telephone of a common telephone network. The Internet telephone terminal (801), the gateway server (802), the gateway 1 (803), and the gateway 2 (804) are connected to the network to which two or more LAN was connected. The Internet telephone terminal (801) comprises a personal computer, a microphone (805) and a loudspeaker (806) are connected to a main part, and the software (it is hereafter called Internet telephone software) which makes voice communication possible via the Internet is installed. The IP address of

the gateway 1 is "129.60.20.10" and the connected telephone number is taken as "03-xxxx-xxxx." The IP address of the gateway 2 is "129.60.30.10" and the connected telephone number is taken as "0468-xx-xxxx."

[0034]A gateway server (802) comprises a personal computer and has a gateway management table (807) in an inside. The example of a gateway management table (807) is shown in drawing 5. Each long-distance number and each IP address of the gateway 1 and the gateway 2 in a network are recorded on this gateway management table (807). A gateway server's (802) own IP address is set to "129.60.10.1."

[0035]From an Internet telephone terminal (801), when a telephone number connects with the telephone (808) of the common telephone network of "03-1234-5678", the telephone number "03-1234-5678" of the partner point is inputted at this Internet telephone terminal (801). This Internet telephone terminal (801) asks the IP address of the gateway which should be connected by the inputted telephone number "03-1234-5678" to the gateway server (802) of the IP address "129.60.10.1" beforehand registered into the self-device. Recognize the long-distance number "03" from the telephone number "03-1234-5678" which received, and the gateway management table (807) in a self-device is searched with this gateway server (802). The IP address "129.60.20.10" of the gateway 1 (803) corresponding to a long-distance number "03" is obtained, and this IP address "129.60.20.10" is returned to the Internet telephone terminal (801) of inquiry origin.

[0036]An Internet telephone terminal (801) will transmit a call origination packet to the gateway 1 (803) of this IP address "129.60.20.10", if the return value from a gateway server (802) is received. At this time, the telephone number "03-1234-5678" of the partner point is simultaneously told to this gateway 1 (803).

[0037]Call origination of this gateway 1 (803) is carried out to the common telephone network 2 by this telephone number "03-1234-5678" that received. The telephone call between the gateway 1 (803)-telephones 1 (808) is established because the telephone 1 (808) of this telephone number "03-1234-5678" carries out singing and carries out on hook [of this]. After telephone call establishment, this gateway 1 (803) transmits the packet which notifies telephone call establishment to an Internet telephone terminal (801), the telephone call between Internet telephone terminal (801)-telephones (808) establishes it, and transmission and reception of voice data are performed.

[0038]From an Internet telephone terminal (801), when "0468-12-3456" is applied as a telephone number of the partner point, Through the same procedure, with the gateway management table (807) of a gateway server (802), the IP address "129.60.30.10" of the gateway 2 (804) is chosen, and the telephone 2 (809) of a telephone number "0468-12-3456" is called, and carries out singing. When on hook [of the telephone 2 (809)] is carried out, the telephone call between the telephone 2 (809)-gateways 2 (804) is established, and the gateway 2 (804) after that, The packet which notifies telephone call establishment is transmitted to an Internet telephone terminal (801), the telephone call between the Internet telephone terminal (801)-telephones 2 (809) is established, and transmission and reception of voice data are performed.

[0039]Drawing 6 is a figure explaining the 2nd example mode of this invention. the numerals 2 in a figure -- common telephone network and 3-i, ** LAN, and 1001 -- a gateway and 1002, as for a gateway and 1003, a gateway server and 1004 express a gateway management table, 1005 expresses telephone, and 1006 expresses telephone.

[0040]This example is an example in the case of talking over the telephone by the telephone of a common telephone network via gateways. The gateway 1 (1001) and the gateway 2 (1002) are connected to the network to which two or more LAN was connected. The IP address of the gateway 1 is "129.60.20.10" and the connected telephone number is taken as "03-xxxx-xxxx." The IP address of the gateway 2 is "129.60.30.10" and the connected telephone number is taken as "0468-xx-xxxx."

[0041]A gateway server (1003) comprises a personal computer and has a gateway management table (1004) in an inside. The example of a gateway management table (1004) is shown in drawing 7.

Each long-distance number and each IP address of the gateway 1 and the gateway 2 in a network are recorded on this gateway management table (1004). A gateway server's (1003) own IP address is set to "129.60.10.1."

[0042] From the telephone 1 (1005) connected to the common telephone network, the telephone number "xxxx-xxxx" of the nearby gateway 1 (1001) is dialed. The gateway 1 (1001) sends out the guidance which stimulates the input of the telephone number of a connection destination to the telephone 1 (1005), after auto-answering. The telephone number "0468-12-3456" of the telephone 2 (1006) of the connection partner point is inputted by the telephone 1 (1005). The gateway 1 (1001) which this telephone number "0468-12-3456" inputted by the telephone 1 (1005) was told to the gateway 1 (1001), and received this, It asks by this telephone number "0468-12-3456" that received to the gateway server (1003). From this telephone number "0468-12-3456" that received, a gateway server (1003) extracts the long-distance number "0468", and by this. The gateway management table (1004) in a self-device is searched, the IP address "129.60.30.10" of the gateway 2 corresponding to a long-distance number "0468" is obtained, and this IP address "129.60.30.10" is returned to the gateway 1 (1001) of inquiry origin. The gateway 1 (1001) transmits a call origination packet for this IP address "129.60.30.10" to the terminal of this IP address "129.60.30.10" after reception. At this time, the telephone number "0468-12-3456" of a connection destination transmits simultaneously. The gateway 2 (1002) of an IP address "129.60.30.10" is auto-send to a common telephone network by this telephone number "0468-12-3456" after receiving this, and the telephone 2 (1006) of a telephone number "0468-12-3456" carries out singing. By carrying out on hook [of this], the telephone call between the gateway 2 (1002)-telephones 2 (1006) is established. After telephone call establishment, this gateway 2 (1002) transmits the packet which notifies telephone call establishment to the call origination former gateway 1 (1001), and the telephone call between the gateway 1 (1001)-gateways 2 (1002) establishes it. In this stage, the gateway 1 (1001) sends the sound from the telephone 1 (1005) to the gateway 2 (1002), and, thereby, the voice communication between the telephone 1 (1005)-telephones 2 (1006) establishes it.

[0043] It is a figure which explains the 3rd example mode of this invention to drawing 8. the numerals 2 in a figure -- common telephone network and 3-i -- LAN and 1201 -- an Internet telephone terminal and 1202 -- a gateway and 1203 -- a gateway and 1204 -- a microphone and 1205 -- a loudspeaker and 1206 -- the gateway management table of the gateway 1. 1207 expresses the gateway management table of the gateway 2, 1208 expresses telephone, and 1209 expresses telephone.

[0044] This example is an example in the case (when there is no gateway server) of having a gateway management table and a gateway server function in a gateway. The Internet telephone terminal (1201), the gateway (gateway) 1 (1202), and the gateway 2 (1203) are connected to the network to which two or more LAN was connected. An Internet telephone terminal (1201) shall comprise a personal computer, a microphone (1204) and a loudspeaker (1205) shall be connected to a main part, and the software (it is hereafter called Internet telephone software) which makes voice communication possible via the Internet shall be installed. The IP address of the gateway 1 is "129.60.20.10" and the connected telephone number is taken as "03-xxxx-xxxx." The IP address of the gateway 2 is "129.60.30.10" and the connected telephone number is taken as "0468-xx-xxxx."

[0045] There is a gateway management table (1206) in the inside of the gateway 1 (1202). The example of the gateway management table (1206) of the gateway 1 is shown in drawing 9. Each long-distance number and each IP address of the gateway 1 and the gateway 2 in a network are recorded on this gateway management table (1206). The gateway 1 (1202) has the function to search the gateway management table (1206) in a self-device, and to return the IP address of an applicable gateway, to the inquiry by a telephone number.

[0046] There is a gateway management table (1207) also in the inside of the gateway 2 (1203). The example of the gateway management table (1207) of the gateway 2 is shown in drawing 10. The gateway management tables (1207) of this gateway 2 (1203) are the same contents as the gateway

management table (1206) of the gateway 1 (1202). There is a function to return the IP address of the gateway which searches the gateway management table (1207) in a self-device also to the gateway 2 (1203), and corresponds to it to the inquiry by a telephone number.

[0047]From an Internet telephone terminal (1201), when a telephone number connects with the telephone 1 (1208) of the common telephone network of "03-1234-5678", the telephone number "03-1234-5678" of the partner point is inputted at this Internet telephone terminal (1201). This Internet telephone terminal (1201) is beforehand registered into a self-device. The IP address of the gateway which should be connected by the inputted telephone number "03-1234-5678" is asked to the gateway 1 (1202) of the IP address "129.60.20.10" which occurred. The long-distance number "03" is recognized from the telephone number "03-1234-5678" which received, the gateway management table (1206) in a self-device is searched with this gateway 1 (1202), and the IP address of the gateway 1 corresponding to a long-distance number "03" is looked for. As a result, it turns out that an applicable gateway is a self-device since this is the same as the IP address of a self-device (gateway 1 (803)) although the IP address "129.60.20.10" is obtained. Therefore, this gateway 1 (1202) is the partner point telephone number "03-1234-5678" which received, it is sent to a common telephone network and the telephone 1 (1208) of a telephone number "03-1234-5678" carries out singing. The telephone call between on hook, then the gateway 1(1202)-telephone 1 (1208) establishes the telephone 1 (1208). After telephone call establishment, this gateway 1 (1202) transmits the packet which notifies telephone call establishment to an Internet telephone terminal (1201), the telephone call between the Internet telephone terminal (1201)-telephones 1 (1208) establishes it, and transmission and reception of voice data are performed.

[0048]From an Internet telephone terminal (1201), as a telephone number of the partner point, when the telephone number "0468-12-3456" of the telephone 2 (1209) is applied, This Internet telephone terminal (1201) is the telephone number "0468-12-3456" inputted to the gateway 1 (1202) of the IP address "129.60.20.10" beforehand registered into the self-device, The IP address of the gateway which should be connected is asked. Recognize the long-distance number "0468" from the telephone number "0468-12-3456" which received, and the gateway management table (1206) in a self-device is searched with this gateway 1 (1202), The IP address of the gateway corresponding to a long-distance number "0468" is looked for, the IP address "129.60.30.10" is obtained, and this is returned to the Internet telephone terminal (1201) of inquiry origin. An Internet telephone terminal (1201) transmits a call origination packet to this received IP address "129.60.30.10." This tense hand's telephone number "0468-12-3456" is simultaneously told to this gateway 2 (1203). Call origination of this gateway 2 (1203) is carried out to a common telephone network by this telephone number "0468-12-3456" that received. The telephone call between the gateway 2(1203)-telephones 2 (1209) is established because the telephone 2 (1209) of this telephone number "0468-12-3456" carries out singing and carries out on hook [of this]. After telephone call establishment, this gateway 2 (1203) transmits the packet which notifies telephone call establishment to an Internet telephone terminal (1201), the telephone call between the Internet telephone terminal (1201)-telephones 2 (1209) establishes it, and transmission and reception of voice data are performed.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The one example lineblock diagram of this invention with a gateway server is shown.

[Drawing 2]The example of a gateway management table is shown.

[Drawing 3]It is a figure explaining the situation of the registration processing to a gateway server.

[Drawing 4]It is a figure explaining the mode of the 1st example of this invention.

[Drawing 5]The example of a gateway management table (807) is shown.

[Drawing 6]It is a figure explaining the mode of the 2nd example of this invention.

[Drawing 7]The example of a gateway management table (1004) is shown.

[Drawing 8]It is a figure explaining the mode of the 3rd example of this invention.

[Drawing 9]The example of the gateway management table (1206) of the gateway 1 is shown.

[Drawing 10]The example of the gateway management table (1207) of the gateway 2 is shown.

[Drawing 11]The example of a gateway is shown.

[Drawing 12]The example of the connecting operation using a gateway is shown.

[Drawing 13]The example of an IP address is shown.

[Drawing 14]The example of a network in case there are two or more gateways is shown.

[Description of Notations]

1 : gateway

2 : common telephone network

3 : LAN/Internet

4 : personal computer

5 : telephone

801: Internet telephone terminal (PC)

802: Gateway server

803: Gateway 1

804: Gateway 2

805: Microphone

806: Loudspeaker

807: Gateway management table

808: Telephone 1

809: Telephone 2

1001: Gateway 1

1002: Gateway 2

1003: Gateway server

1004: Gateway management table

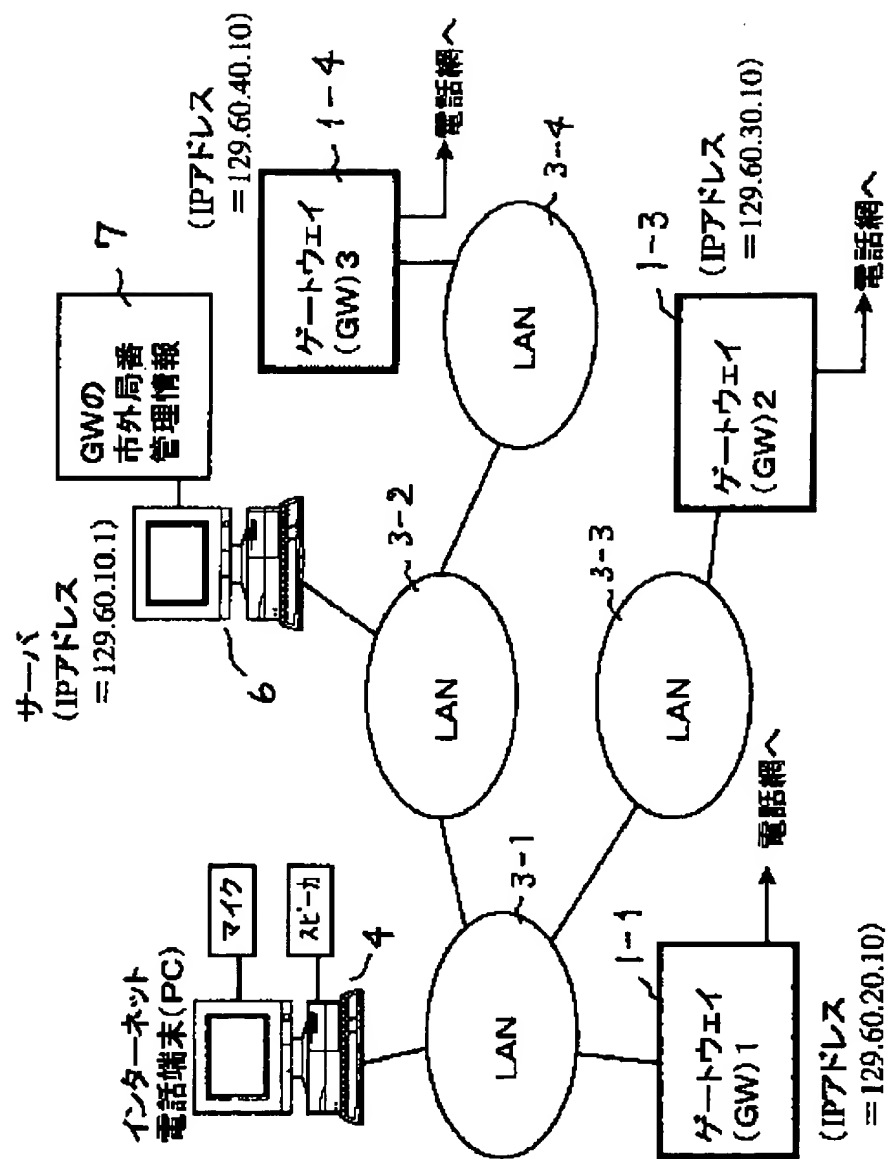
1005: Telephone 1

1006: Telephone 2

1201: Internet telephone terminal (PC)

1202: Gateway 1
1203: Gateway 2
1204: Microphone
1205: Loudspeaker
1206: The gateway management table of the gateway 1
1207: The gateway management table of the gateway 2
1208: Telephone 1
1209: Telephone 2

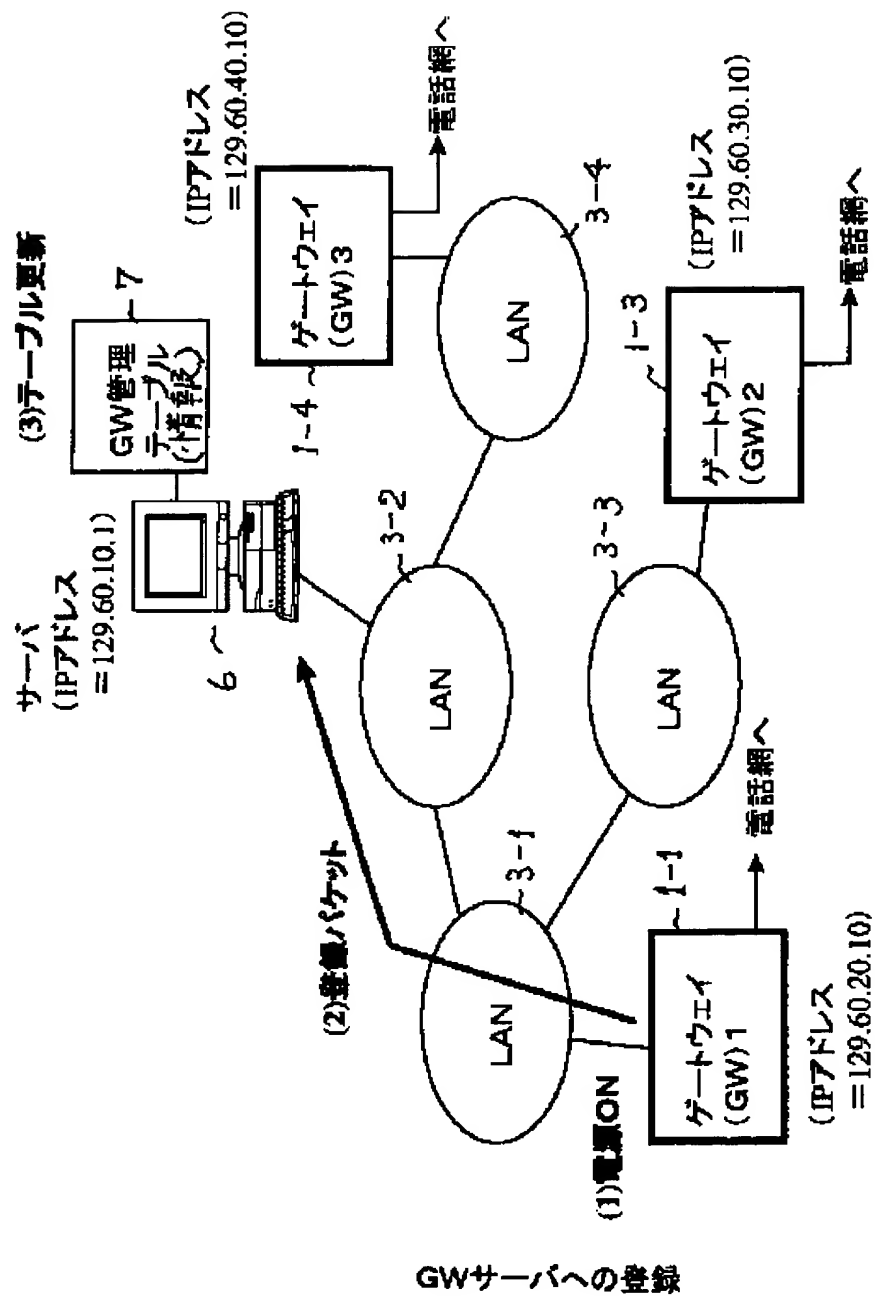
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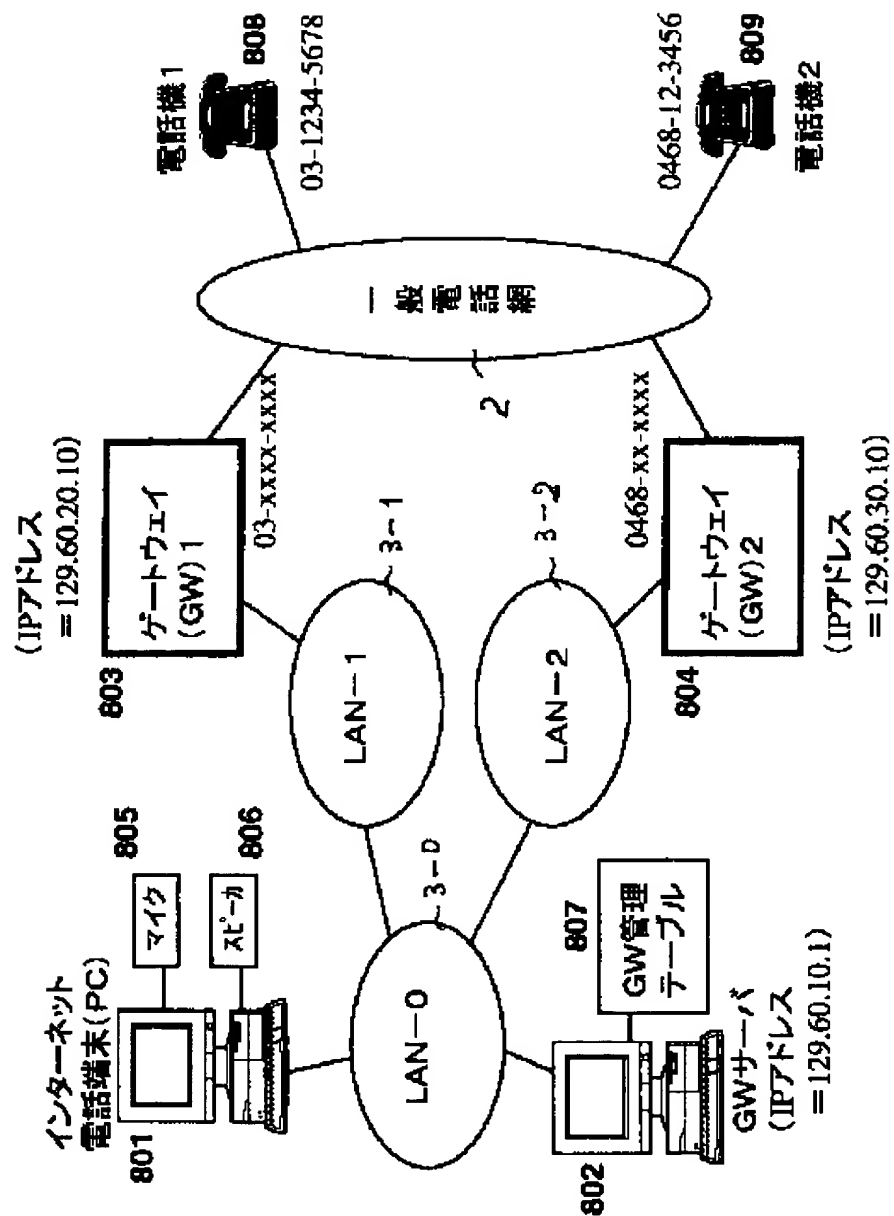


本発明の実施例構成

市外局番	IPアドレス
011	129.60.20.10
03	129.60.30.10
0468	129.60.40.10
⋮	⋮

GW管理テーブルの例

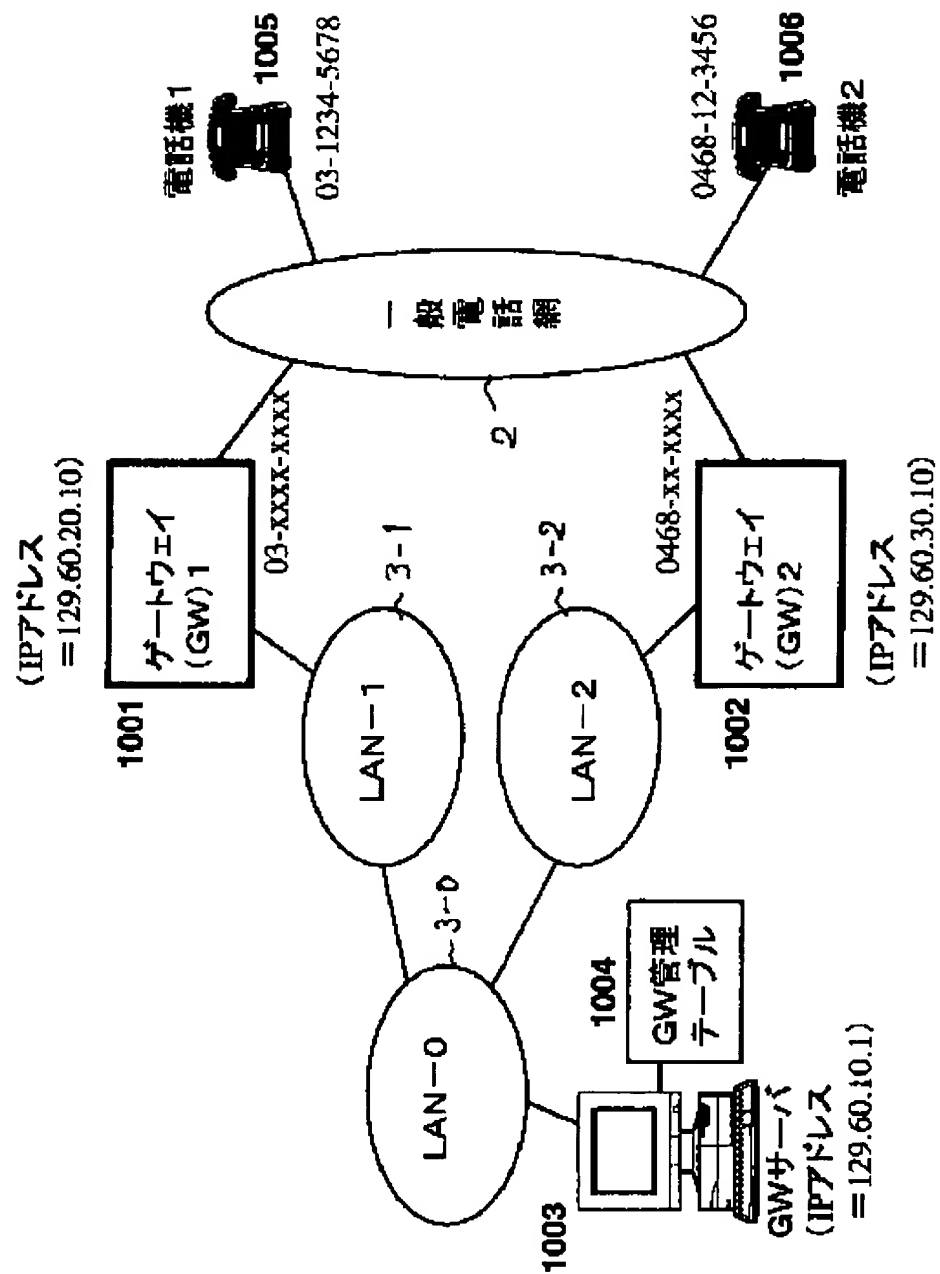




本発明における第1の実施例

市外局番	IPアドレス
03	129.60.20.10
0468	129.60.30.10

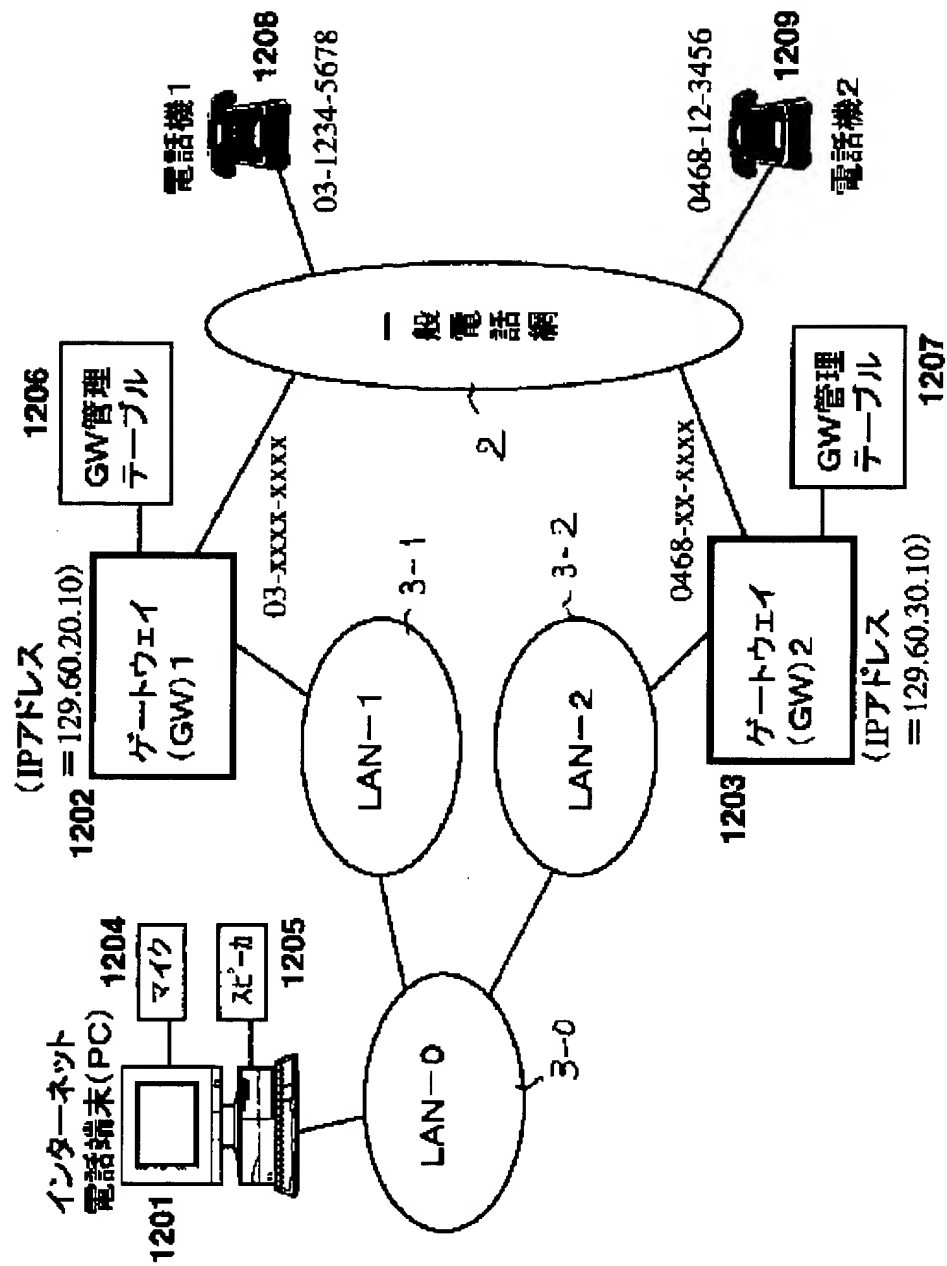
GW管理テーブル(807)の例



本発明における第2の実施例

市外局番	IPアドレス
03	129.60.20.10
0468	129.60.30.10

GW管理テーブル(1004)の例



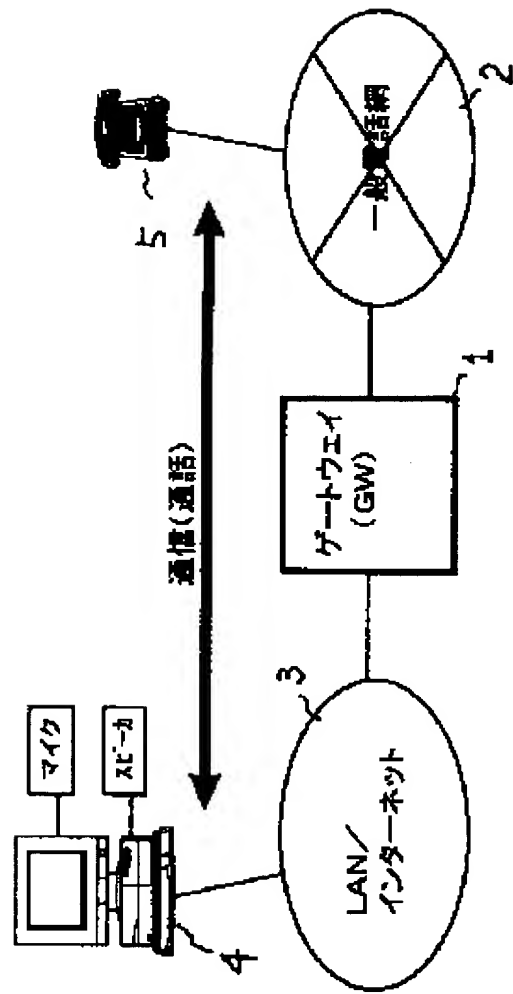
本発明における第3の実施例

市外局番	IPアドレス
03	129.60.20.10
0468	129.60.30.10

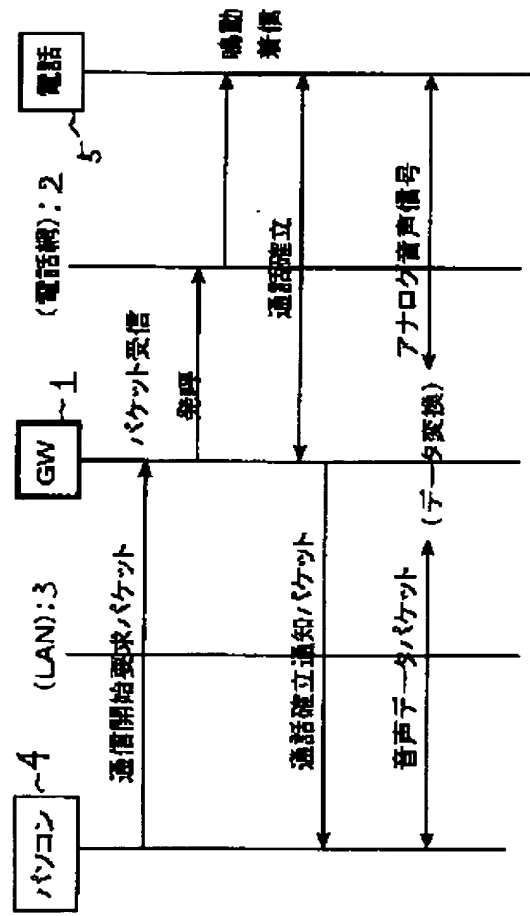
GW1のGW管理テーブル
(1206)の例

市外局番	IPアドレス
03	129.60.20.10
0468	129.60.30.10

GW2のGW管理テーブル
(1207)の例

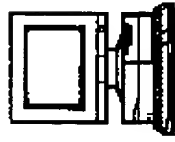


ゲートウェイ(GW)の例

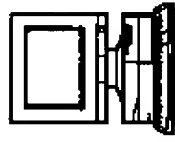


ゲートウェイ(GW)の動作の例

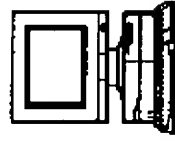
端末A
(IPアドレス
= 129.60.10.11)



端末B
(IPアドレス
= 129.60.10.12)

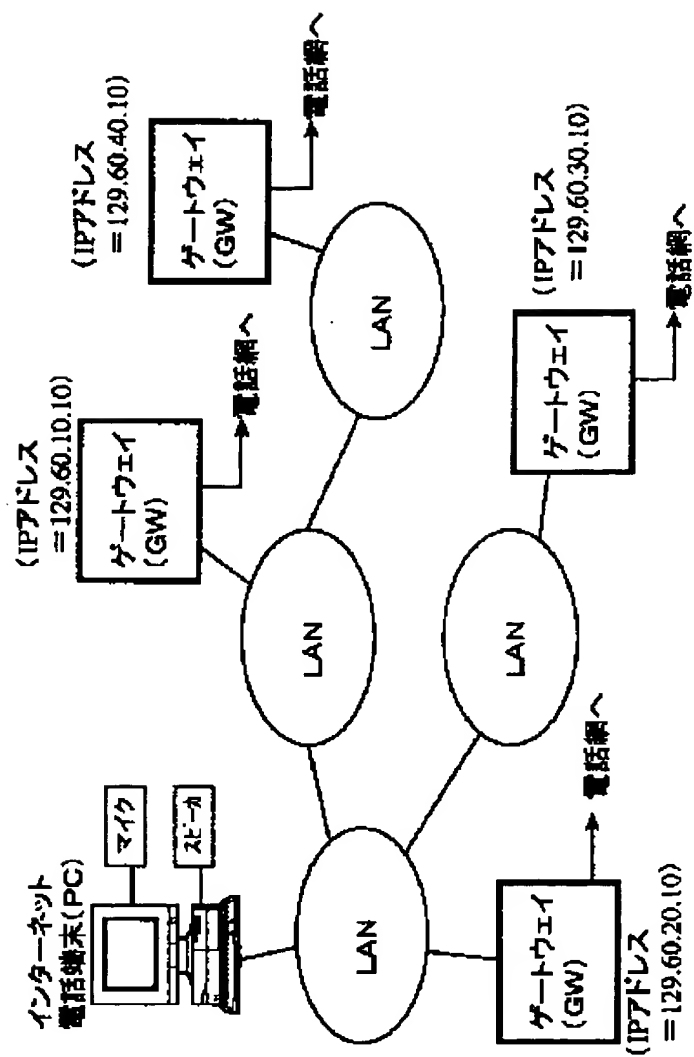


端末C
(IPアドレス
= 129.60.10.13)



LAN

IPアドレスの例



ゲートウェイ(GW)が複数ある場合